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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,891	11/25/2003	Wen C. Huang		6245

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EXAMINER	
PADGETT, MARIANNE L	
ART UNIT	PAPER NUMBER
1762	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/720,891	Applicant(s) HUANG ET AL.	
	Examiner Marianne L. Padgett	Art Unit 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 25 November 2003.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-25 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-25 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 11/25/03.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. Claims 1-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1 & 20, steps (1), it is unclear what is meant by "forming a precursor fluid to said functional material". This makes no sense as phrased, possibly due to non-idiomatic English and/or wrong word choice. Would --forming ...fluid of said functional material-- be the intent? It would require the functional material to be in the precursor fluid, and in the same form as the antecedent in the claim language indicates "said functional material" is in the deposited pattern or after orientation treatment. However, as noted below, some dependent claims, such as 15, appear to indicate that the functional material in the precursor fluid might not be the same as that in the deposit or after treatment thereof, thus creating ambiguity or uncertainty in what this limitation represents.

In claims 1 & 20, steps (3) & (4), respectively, the term "said pattern-producing step" lacks antecedent basis due to completely inconsistent terminology. For purposes of examination, the examiner will assume that this limitation is referring to the preceding limitations labeled (2) or (3), respectively for claims 1 & 20.

Use of relative terms that lack clear metes and bounds in the claims, or in a definition provided in the specification or in relevant cited prior art, is vague and indefinite. In the claims, see "highly" used in "highly localized...field". With respect to "highly", no definition was found in the specification, although claim 10 provides exemplary metes and bounds for the term. However an example is not a definition, and it is uncertain what beyond the scope of <1 μm size might be included by the relative term "highly localized...field", especially as the range of claim 10 does not appear to be discussed in the body of specification.

In the preambles of the independent claims "micro- or nano-lithography", also contains the relative prefixes "micro" & "nano", such that the size ranges referred to by these prefixes for the direct-write method are uncertain, especially considering that the bodies of the independent claims requires use of "sub-micrometer" tips or orifices for dispensing patterns of "sub-micrometer dimensions" (i.e. the tip or orifice & the pattern formed are all required to be <1 μm), which would appear to exclude the claimed "micro-lithography". Also in claims 8, 12, 19 & 24, see use of relative terms "near" & "micro" describing the limitations of "a near-field scanning optical microscope tip" and "a micro-pipette tip".

In claim 9, "at least a micrometer- and/or nanometer-scaled region" is unclear in scope, because it is uncertain what range this encompasses. Is it greater or equal to 1nm, to 0.1 nm or what? Also, is this the region over which the pattern is spread or is it only giving dimension for the surface on which the material is deposited, exclusive of adjacent uncoated areas between patterned deposition?

In claim 15, "reactive" with respect to what? If the functional material in the precursor fluid is the same as in the final deposit as indicated by the antecedent phrasing, then it can't be reacting with the gas in the atmosphere. Also, for claim 14, when does this exposure to "a controlled atmosphere" occur, before, during or after the steps 1(2) or 1(3)?

In claim 16, it is noted that "hot" in "hot air blower" is technically a relative term, as the metes and bounds of hot are not defined, but may be considered to be synonymous with --heated air blower--, which states the action rather than implying a range of temperature.

The Markush group of claim 2 is improper as written, as it does not use standard Markush terminology, and Markush groups are required to be made up of mutually exclusive species, however since X may be any ligand (see last line of claim 2) & the claimed formulas include n = 0, thus including R_2 or R_1=X and creating an essentially indeterminable number of overlapping compounds, since "a ligand" includes all the preceding mentioned options, plus any other element or compound that can possibly be attached. Also the option of "unsaturated compounds" includes all compounds in existence

(organic or nonorganic), which have any double bonds or triple bonds or the like. Note that while it is no longer improper to have double ranges in claims, the narrower range will always be considered optional, since the claim includes any term that reads on the broader range. See alternatives given in parentheses or generic groupings followed by exemplary compounds.

The phrasing of claim 5 can be considered confusing since "said desired pattern" is referring to a configuration, such as is consistent with the limitations of claims 3 or 4, but this claim instead of further describing the pattern, claims that the pattern (i.e. design) is comprised of a certain class of materials, which is not logical. Would the intent be that the functional material (which is deposited in the pattern) be a "self-assembled monolayer"?

Claims 6 & 7 define process steps related to "said compound", however no compound has been introduced in independent claim 1, from which these claims directly depend, hence there's never been a compound deposited on the target surface, and these claims are completely unclear with respect to the limitations of the independent claim, so cannot be further examine with respect to the prior art.

Claim 25 appears to be impossible or contradictory of independent claim 20 from which it depends, as the orifice in the tip of the nozzle is required to contact the surface, hence no "droplet" per se could form & be attached thereto, since there would be no space inwhich such a droplet could form, therefore the intent of claim 25 is unclear.

2. Claims 9, 12, 19 & 24 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Since the independent claim 1 requires the pattern be deposited in sub-micrometer dimensions, the phrasing of this claim 9, which includes "said pattern comprises at least a micrometer-... scaled region" would appear to be broadening the scope of the claim, which is improper. Similarly, in claims 12,

19 & 24, it would appear that a "micro-pipette" would have a tip or orifice of micrometer dimensions (i.e. >1 μm), not sub-micrometer, hence this option also appears to broaden the scope of the independent claim.

3. The disclosure is objected to because of the following informalities: references to copending cases need to be updated, for example see "... pending, 10/353,667...", which case is now abandoned, not pending.

Appropriate correction is required.

4. It is noted that while some of the terms of claim 17's Markush group may appears to have some overlap as indicated by dictionary definitions in Hawley's Condensed Chemical Dictionary or Hackh's Chemical Dictionary, more extensive discussion of terms such as ferromagnetic material & ferrimagnetic material in Lerner et al., Encyclopedia of Physics, indicate different meanings or separate scopes for these terms

5. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the limitation of claim 10, which requires the highly localized field to be focused in a region smaller than 1 μm in size, was not found in the body of the specification.

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-4 & (6-7) 8-25 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 & 13-20 of U.S. Patent No. 6,706,234 B2, in view of Hallen et al. ("A Split-Tip Proximal Probe for Nanoscale Deposition of Molecules with Controlled in-Plane Orientation").

Although the conflicting claims are not identical, they are not patentably distinct from each other because, while the patent claims are narrower in some aspects than the present claims, such as reciting specific materials instead of broad formulas or general categories of materials in the dependent claims, the patent claims are encompassed by the broader or overlapping material limitations. In particular for independent claim 1 of (234), the patent's deposited "polarized material" is species of the instant claims' "functional material", where application claims 2 & 17 are directed to materials used, overlap with patent claims 3-4, 6 & 19. While the present claims are more generically directed by only requiring orientation of the material by either electric or magnetic fields instead of the patents' action of polarization requiring

a DC electric field, it would have been obvious to one of ordinary skill in the art when orientating polarizable material, that the kind of orientation to be caused would be polarization, since type of material deposited suggests such a desired effect. The patent claim 1 also is more narrow than the instant claim 1 by requiring the use of a DC electric field for poling, instead of the broader and relative "highly localized electric or magnetic field". however the D.C. electric field is encompassed by the applications generic option, and would have been an obvious choice as a member of a limited group of known sources.

The patents independent claim 8 similarly differ form this case's independent claims & claim 16 by the requirement for polarization solvent, and polarized resultant material, instead of the broader liquid component, which encompasses the patent solvent, were both sets of claims have limitations directed to solvent or liquid removal. Note the solvent/liquid removing means present in both claims, are inclusive of techniques that control atmosphere, and air contains both inert and reactive gases.

While this cases' dependent claim 13 is not present in the patent, but claim 13's heating or cooling options would have been obvious to one of ordinary skill to employ depending on the material being deposited, i.e. the parameters it requires in order to deposit and adhere, which would have been determined by routine experimentation and/or review of known properties of the precursor fluid being employed. As for control of atmosphere and the list of generic types, when its being employed is uncertain, but electric fields as employed by either case, typically employ controlled atmospheres as claimed, hence would have been obvious optional to use with the patent's claimed D.C. electric field or corona discharge, since the ionization also produced by such a source can also induce chemical reactions which may be undesirable, unless the atmosphere excludes potential contaminates.

A patent claims differ from the present application claims by not requiring use of tips possibly with orifices that require sub-micrometer dimensions, such as the particularly claimed split-tip proximal probe, or requiring the direct right produced patterns to be sub-micrometer dimensions. The patent claims (7 & 14) are directed to a diverse set of dispensing means, including inkjet print heads, liquid droplet

generators, syringe pump, etc. and includes use of plural nozzle orifices, and while requiring a DC electric field for poling, does not require a particular structure for producing this limitation. The reference to Hallen et al. is directed to producing nanostructures of dimensions claimed, using a nano-poling scheme with claimed split-tip proximal probe devices, where it is taught that this nano-poling scheme should be more effective at orienting molecules than conventional current poling methods due to the larger electric fields that can be generated locally due to the ability to create higher electric fields in a very localized region. See the Abstract; Introduction; Potential Applications, especially the first three& last paragraphs thereof ; the Deposition Scheme, especially figure 3; & the paragraph concerning "Electrical Field Near the Tip". These sections point out the advantages of using split tip probes for poling during growth of conductive polymer wires defined on nanometer scales, where the process produces the orientation of all the molecules affecting improved conductivity & for depositions from solution after alignment the molecules are linked to the substrate, such as by light or current pulses, but only the oriented molecules are linked to the surface. The usefulness of this technique for biological materials, such as cells/protein, is also pointed out. Given the advantages taught by Hallen et al. for the split-tip proximal probe for poling with electric field, it would have been obvious to one of ordinary skill in the art to applied to specific technique to the more general electric field polling technique of the patent (234) for the advantages it provides, especially considering that the materials claimed include materials, such as polymer is capable of being polarized, which would especially be inclusive of conductive, and include biological materials such as proteins that were discussed as beneficially treated by Hallen et al. & possible general deposition techniques of the patent are consistent with Hallen et al., noting that use of this technique enables the claim dimensions.

8. Other cases of interest of applicant's or with overlapping inventors include US 2004/0251581 A1 & patents 6,401,002 B1 or 6,165,406 to Jang et al, which have teachings of features

related to liquid deposition be a a nozzle tip, but without limitations relating to orientation or sub-micron deposition of material.

9. Claims 20, 22 & 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pond et al (5,382,963).

Pond et al teach inkjet printing ink with sub micron sized magnetic (ferromagnetic) particles, reading on the claimed precursor fluid and patterned dispending, where the particles are oriented using a magnetic field and simultaneously dried, after their deposition on the substrate. Various drying means may include radiant heaters, and/or airflow, where airflow may be caused by use of a fan or a vacuum source. See abstract; figures; summary; col. 3, lines $29\text{-}40^{+}$; col. 4, lines 10-30 & 45-col. 5, line 18; and claims 1-3 and 5-6. As illustrated in figure 2, the print head 14 has multiple nozzles, were ejected droplets produced spots (i.e. dots) with diameters of three mills or 75 μm. While the independent claim requires "sub-micrometer" tip & patterned dimensions, dependent claim 25 broadens the scope to include "micro-" dimensions, hence given the presently ambiguous dimension limitations, this feature is considered covered by the broader possible scope. Similarly, while claim 20 requires tip/orifice contact, claim 25 requires droplet formation, hence Pond et al.'s formation of droplets is consistent with dependent claim 25 due to the ambiguous/contradictory options. [Note that eliminating the broad in scope from the dependent claims, such that the limitations in independent claim 20 are not contradicted, will remove Pond et al.]

Bond et al. differs by not discussing shape for individual nozzles, other than orifice dimensions & illustrating multiple nozzle ejections, however it would have been obvious to one of ordinary skill in the art that for the individual orifices, it would have been affected to employ tips for their typical use in channeling & controlling of droplet formation & direction.

10. Claims 1, 4, (6-7), 8-11 & 17-18 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Hallen et al ("A Split-Tip Proximal Probe for Nanoscale Deposition of Molecules with Controlled in-Plane Orientation"), discussed above in section 7.

Claims 3 & 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hallen et al.

While Hallen et al does not have a month, only a 2003 date (no month), as the literature reference was submitted with an IDS in copending SN 10/353667 on 1/30/03, it must have been previously published before that date to be supplied, so is prior art.

While Hallen et al. does not discuss dot containing patterns, this is a design consideration dependent on specific requirements of the desired product, hence would've been obvious dependent on particular products being manufactured, especially considering that the exemplary wiring patterns for conductive polymers or biological samples, such as cell tissues, may frequently be inclusive of dot patterns, either for electrical connection pads or sample purposes, respectively.

While Hallen et al.'s general discussion of a deposition scheme does not discuss substrate temperature, atmosphere present or what becomes of the liquids in the solutions that are not part of the deposit, the dependent claims directed to temperature control, atmosphere control or removal of a liquid component relate to common process parameters & procedures that must be controlled or considered in order to reproducibly perform any chemically related reaction or deposition from a solution, where the entire solution is not deposited/solidified, hence it would've been obvious to one of ordinary skill in the art to consider such parameters & procedures and and the in the and based on the particular material and its process requirements so as to achieve reproducible results.

Hallen et al. does not discuss use of multiple split-Tip proximal probes, however when one such instrument is employed for patterned deposition is taught in Hallen et al., it would've been obvious to one of ordinary skill in the art to employ plural taught probes, dependent on the size and complexity of the

particular product being produced, so as to most efficiently (time, speed & productivity) produce the desired products, as the number of .deposition/treatment sources used concurrently is not patently sit Mexican, lacking any unexpected results for such multiple use.

11. Claims 1-5, (6-7), & 8-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mirkin et al. (6,635,311 B1), in view of Hallen et al (discussed in sections 10 & 7 above).

Mirkin et al. teach direct-write nanolithography (dip pen nanolithography (DPN)) on a solid substrate surface, by providing a tip coated with a patterning compound, where the tip contacts the substrate while coated with patterning material delivered to the substrate surface to create sub-micrometer dimension patterns (abstract; col. 10, lines 26-39; & claims). The types of useful tips structures are described as "scanning probe microscope (SPM) tips", including "atomic force microscope (AFM) tips, near field scanning optical microscope (NSOM) tips", etc. (col. 4, lines 55-67), where NSOM tips, with hollows which serve as reservoirs for the patterning compound are taught to be preferred (col. 5, lines 1-5). It is also taught that solvents may be employed depending on the particular patterning compound & may be dried after deposition (col. 5, lines 15-30+; col. 9, lines 21-38). Illustration & discussion of patterns produced include dots & lines (figures, especially 2 & 9, described on col. 3-4). The patterning compound is referred to as an ink and delivered to the tip through capillary action (col. 2, lines 40-54), where many suitable compounds listed as useful therefore are found on col. 6, lines 23-col. 7, lines 12, where the descriptions employed are almost the same as those in applicants' claim 2, which is essentially a condensed version of this listing (also see table 1 on col. 16-17 for specific material & applications). Mirkin et al. also disclose the possibility of using plural tips, especially when plural patterns are desired (col. 10, lines 40-60 +), and teach that DPN may be used in combination with other lithographic techniques, such as in conjunction with microcontact printing, or other lithographic techniques mentioned their background, such as techniques that rely on scanning probe instruments, self-assembly monolayers, etc. (col. 11, lines 66-col. 12, line 3 & col. 1-2, especially bridging paragraph), with col. 12 discussing

various considerations that affect the direct-writing resolution. DPN is taught to be useful in fabrication of a wide variety of microelectronic, micromechanical, microarray, biological materials, etc. (col. 12, lines 47-63+). Mirkin et al. discuss use of a hydrophilic self-assembly monolayer on col. 21, lines 5-30, and have discussion on using their techniques to positioning & orientation, or discussion concerning molecular-based electronics to generate, align & interface structures (col. 11, lines 1-25 & col. 22, lines 52-60), however Mirkin et al. has no discussion of using electric or magnetic fields for attaining or creating a preferred orientation in a specific material.

Given Mirkin et al.'s suggestions concerning combination of nanolithographic techniques & use of DPN techniques for molecular-based electronics to generate alignment and interface structures, it would have been obvious to one of ordinary skill in the art to combine Mirkin et al.'s teachings with the nanoscale patterning techniques discussed by Hallen et al. for use in molecular-based electronic devices where poling of polymeric or biological materials creates alignment that optimizes properties, such as conductivity in conduct of polymers, for the advantages such optimization provides to the end results, and because both references direct their teaching towards nanolithographic patterning of molecular-based electronic device formation, with Mirkin et al. primarily directed towards the delivery & patterned deposition of materials, while Hallen et al. teaches the advantages of their specific use of electric field for poling, which is taught to produce superior results, such as increased conductivity in conductive polymers, especially since all on the fourth page of Hallen et al., in paragraph labeled "*Reduced Driving Voltage*", Hallen et al. also suggests "combining the 'dip-pen' lithography with our orienting capabilities...", providing further motivation for combination of these techniques.

12. Vincent et al (6,556,479 B1) teach electrochromic molecular colorants, where multicolor or mosaic patterns of pixels may be deposited, via means such as ink jet printing. The ink may be a self-assembling strata, with typical coating containing 1-30% solid contents, may include polymeric binders, such as polymethacrylates or polyurethanes, where the coating with the suspended electrochromatic

colorants selectively switchable between at least two optical states, that may be dried or cured with orienting of the colorant before end use for writing, via use of an electrical field for optimum alignment. Use of localized electric fields is taught with discussion of electrode pairs or electronic pen tips. Vincent et al provides discussion of relevant sizes, applicable to their process. See the abstract; figures, esp. 2-7; summary; col. 9, lines 46-50; col. 10, lines 24-35; col. 12, lines 1-30 for electric field effects & advantages in the imaging resolution; col. 13, lines 27-col. 14, lines 67; col. 16, lines 1-67, esp. 3-15 (electronic pen tip) and 60-65; and col. 17, lines 4-30^{+} (pixel or dot deposition), with lines 55-65 noting exemplary 1200 or 4800 pixels/inch, which means the pixels are less than 21 μm or 5.3 μm, respectively depending on separation between dots. However Vincent et al.'s technique has no discussion of using a tip that contacts the surface to discharge precursor fluids.

Fan et al (6,303,056 B1) is of interest for deposition of nonlinear optical material as claimed with possible multiple depositions, with remove of solvent, where simultaneous application of electric field may be employed (Fig., 1, col. 17, lines 49+), however the dispensing technique for the orientable material is not a point-by-point method.

Lemmon et al (4,346,505) and Micheron (4,327,157) also provide teachings on orientation of polymeric film during solvent evaporation (abstract; col. 6, lines 42-68^{+}), but are directed to treatment of an entire sheet, not patterned deposition as claimed.

Tin (2004/0036993 A1) has pattering and orientation teachings of interest, but is not prior art.

Bae et al is of interest for teaching stereolithographic construction of 3D structures that may include magnetic or liquid crystal particles, that are aligned using electric or magnetic fields when the layer is solidified point-by-point, where computerize deposition, with control of movement with respect to planer and individual layer height directions, i.e. 3 dimension. See the abstract; figures; col. 5, lines 20-68; col. 6, lines 25-55; col. 8, lines 3-19 & 39-62; col. 11, line 60-col. 12, line 49; and col. 13, line 38-col. 14, line 3.

13. The literature references (Kim et al., Zhang et al., Hong et al, Xiao et al., Hoffman et al. & Chou et al.) cited by applicant in the IDS filed with the case (11/25/2003) are considered to provide teachings equivalent to & cumulative to the above applied teachings of Mirkin et al. Similarly, the patent to Cruchon-Dupeyrat et al. (7034854 B2) has further direct right nanolithography processes and applications of interest, including DPN, tip usage, including plural tips & microsyringes.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on M-F from about 8:30 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MLP/dictation software

3/28/2007

Marianne Padgett

MARIANNE PADGETT
PRIMARY EXAMINER